For those wishing to bind in two sections, a duplicate Title Page is furnished following page vi

BIOLOGICAL ABSTRACTS

A COMPREHENSIVE ABSTRACTING AND INDEXING JOURNAL
OF THE WORLD'S LITERATURE IN THEORETICAL
AND APPLIED BIOLOGY, EXCLUSIVE
OF CLINICAL MEDICINE

In its departments dealing with theoretical and
applied Bacteriology and Botany the Journal
represents a Continuation of

ABSTRACTS OF BACTERIOLOGY
and
BOTANICAL ABSTRACTS

Volume 3
1929

Published (beginning with the literature of 1926) Under the Auspices of the
UNION OF AMERICAN BIOLOGICAL SOCIETIES
With the Cooperation of Biologists Generally

Editorial and Executive Offices: University of Pennsylvania
Philadelphia, Pennsylvania, U. S. A.

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Nos. 1-3 .... Aug. 30, 1929
Nos. 4-6 .... Oct. 18, 1929
Nos. 7-8 .... Dec. 20, 1929
Nos. 9-11 .... Feb. 17, 1930
No. 12 (Indexes) .... Oct., 1933

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*Publication dates of Vol. 1: No. 1, Jan. 2, 1927; Nos. 2-3, May 24, 1927; No. 4, July 14, 1927; No. 5, Nov. 16, 1927; No. 6, Jan. 30, 1928; Nos. 7-8, May 3, 1928; No. 9 (Index), Dec. 22, 1930.

Publication dates of Vol. 2: Nos. 1-2, July 27, 1928; Nos. 3-5, Oct. 31, 1928; Nos. 6-8, April 18, 1929; Nos. 9-11, July 13, 1929; No. 12 (Index), Dec. 1, 1932.

ERRATA

Abstract No.	
1928	line 3: *for* H *read* H_2O
4213	line 16: for *Rhyzomys* read *Rhizomys*
4305	line 2: *for* medicine *read* medicina
7087	line 4: *for* nitrogen utilization *read* oxygen utilization
7808	line 4: *for* wine *read* urine
8384	line 1: *for* Schopper *read* Schopfer
8512	line 5: for *R. rubrum* read *B. rubrum*
9600	line 17: for *Pteropteris* read *Ptilopteris*
9912	line 5: for *Platychemis* read *Platycnemis*
10555	line 8: *for* Medachl *read* McLachl
10677	line 2: for *Thamonphis* read *Thamnophis*
	line 5: for *T. suaritus* read *T. sauritus*
10746	line 7: for *Octhodromus* read *Ochthodromus*
10792	line 5: for *Meryocodus* read *Merycodus*
13734:	*abstract should be stricken (does not pertain to paper cited)*
16782	line 7: *for* **PLATYPANCHAS** *read* **PLATYPANCHAX**
16790	L. L. Mowbray, not Breder, should stand as authority for the following: family **ANGUILLICHTHYIDAE**; genera **ANGUILLICHTHYS** and **PSEUDOCIRRHITES**; species *Anguillichthys* **bahamensis**, *Grammicolepis* **squamilineatus**, *Amia* **aurolineatum**, *A.* **gloverensis**, *Gramma* **hemichrysos**, *Pseudocirrhites* **pinos**, **and** *Rupiscartes* **cubensis**
16807	line 39: *for* Electridae *read* Eleotridae
17033	line 31: for *Palaconanthropus* read *Palaeoanthropus*
	line 32: for *bonarelli* read Bonarelli
17310	line 12: *for* 81 *read* 18
17589	line 7: *for* Plectognathae *read* *Plectognathi*
22081	line 12: *for* Rocs *read* Roes
22225	add **GEOMENE** as n. subg. of *Haplotrema*
22350	line 17: *for* **ARCTOSTIBIA** *read* **ACTOSTIBA**
22729	line 12: *for* **PROTOPERLARIA** *read* Protoperlaria
22757	line 8: for *Coronatus* read *Coronadus*
22791	line 5: *for* **ANOMAEICHNUS** *read* **ANOMOEICHNUS**
23007	line 10: *After* European *add* and Asiatic. As localities for the five new proposals add, respectively: Ferghana (type) and Bokhara; Pamir; Semiryechensk; western Siberia; eastern Siberia
Page 977	Under Coleoptera cross references, delete nos. 5464 and 5537

BIOLOGICAL ABSTRACTS

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Volume 3 | DECEMBER, 1929 | Number 12
Entries 23040-23071; Indexes

MAMMALIA

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23040. **ANTONIUS, OTTO. Beobachtungen an Einhufern in Schönbrunn. IV. Afrikanische Esel.** *Zool. Garten* [*Leipzig*] 1(7/9): 289-296. 3 fig. 1929.—An account of some of the last representatives of North African wild asses found in their native habitat or kept in European zoos, with notes on their racial characters and distribution. The Nubian race (*Equus asinus africanus**) is believed to have formerly ranged to the western Sahara, but to be practically extinct at present. An undescribed race is believed to have once inhabited the Atlas region. The Somali race still survives in a restricted area. A description is given of some domestic asses* from the Tuareg region of the Sahara.

23040A. **ASTRE, GASTON. Le mammouth de Baulou.** *Bull. Soc. Hist. Nat. Toulouse* 58(4): 609-633. 4 pl., 4 fig. 1929.—Describes and discusses the relationships of a mammoth (*Elephas primigenius**) skeleton found in a fissure at Baulou, Ariege, France, and now in the geological museum of the University of Toulouse. Shells of a snail, probably *Helix memoralis*, were found with the skeleton.—*B. F. Howell.*

23040B. **BORISIAK, A. Brachypotherium aurelianense Nouel, var. nov. gailiti, from the Miocene deposits of the Turgai region.** Известия Академии Наук СССР. (*Bull. Acad. Sci. URSS.*) 1927(3/4): 273-286. 1 pl., 1 fig. 1927.—*B. a.* **gailiti*** (p. 273), from the Jilančik beds, is described from a skull, incomplete dental apparatus, and limb bones, and its relations are discussed. Type in Russian Acad. Sci.

23040C. **BLUNTSCHLI, HANS. Ein eigenartiges an Prosimierbefunde erinnerndes Nagelverhalten am Fuss von platyrrhinen Affen.** *Zeitschr. Wiss. Biol. Abt. D, Roux' Arch. Entwicklungsmech. Organ.* 118: 1-10. 11 fig. 1929.—The primate has in general pronounced flat nails. The monkey has either slightly arched or often pointed nails except Hapalidae (genera *Hapale* and *Midas* and closely related *Callimico*). Here all fingers and four outer toes are provided with sharply pointed claw-like nails. This is a characteristic of prosimians which show a pointed nail on the shortened 2nd toe (3rd toe also in *Tarsius*). A young fetus of *Perodicticus potto* still without hair showed this. A further survey disclosed that a similar peculiar nail was present in *Aotus trivirgatus, Saimiris sciureus, Pithecia hirsuta, Alouatta, Lagothrix,* and *Ateles* (*Cebus*), and in fetuses of *Aotus* and *Pithecia*. It was not seen in a fetus of *Cebus macrocephalus*. This prosimian nail form seems more a hereditary characteristic than a functional adaptation since some of the animals are not good jumpers.—*J. G. Yoshioka.*

23041. **[CHARLEMAGNE, N.]** ШАРЛЕМАНЬ, М. Мамалiологiчнi замiтки. **[Mammalogical notes.]** [German summary.] Українська Академiя Наук. Труди Фiзично-Математичного Вiддiлу. (Збiрник Праць Зоологiчного Музею. ч. 5) (*Acad. Sci. Ukraine, Mém. Cl. Sci. Phys. et Math.*) (*Trav. Mus. Zool.* N°5) 6(3): 485-488. 1928.—Description of a hybrid between *Canis familiaris* and *Vulpes vulpes;* and various records of *Ursus arctos, Lynx lynx,* and *Alces alces* in the Ukraine.

23042. **CHENEY, E. S. Prong-horned antelope in California.** *California Fish and Game* 15(2): 175. 1929.—Increasing in Siskiyou County; decreasing in Lassen County.

23043. **DUBOIS, EUG. The so-called new Pithecanthropus skull.** *K. Akad. Wetenschap. Amsterdam, Proc. Sect. Sci.* 30(1): 134-137. 1 pl. 1927.—Note on a bone fragment from Trinil, Java, believed by Heberlein to be a skull of *Pithecanthropus*, but regarded by the author as the articular head of an elephant's leg bone, probably the humerus of *Stegodon.*

23043A. **EHRENBERG, KURT. Über einen bemerkenswerten Bärenschädel aus der Bärenhöle bei Winden in Burgenland.** *Akad. Wiss. Wien Mat.-Nat. Kl., Anzeiger* 66(27): 306-308. 1929.—Abstract.

23044. **FISHER, C. O. The antelope of Lassen County [California].** *California Fish and Game* 15(4): 349-350. 2 fig. 1929.—A marked increase reported.

23045. **FRY, WALTER. The California badger.** *California Fish and Game* 14(3): 204-208. 1928.—Notes on habits of *Taxidea taxus neglecta* and a plea for its protection.

23046. **HARPER, FRANCIS. The black bear on Mount Katahdin [Maine].** *Bull. Boston Soc. Nat. Hist.* 49. 8-12. 2 fig. 1928.—Notes on food, habitat*, and habits, with a self-taken photograph of this sp.

23047. **HECK, LUDWIG. Halbaffenbastarde.** *Zool. Garten* [*Leipzig*] 1(7/9): 332. 1929.—A report of hybrids between captive *Lemur rufifrons* and *L. macaco*, and between *L. rufifrons* and *L. mongoz.*

23048. **[KALABUKHOV, N. I.]** КАЛАБУХОВ, Н. И. О пище ежей Северо-Кавказского края и Украины. **[Food of hedgehogs from N. Caucasus and the Ukraine.]** [German summary.] Известия Северо-Кавказской Краевой Станции Защиты Растений (*Bull. North Caucasian Plant Protection Sta.*) 4: 62-70. 1928.—In the stomachs and excreta of 24 *Erinaceus rumanicus* and 11 *Hemiechinus auritus*, collected May-Oct., were found the remains of 4 small mammals, 3 birds, 3 lizards, 582 insects (491 Coleoptera), 1 Acarina, and 2 Myriapoda. Plants were rare, being eaten mostly in the drought periods. The insects were mainly terrestrial spp., and at least half of them were injurious to crops. The food of the 2 spp. of hedgehogs did not differ in any important respect.

23048A. **KOENIGSWALD, RALPH von. Bemerkungen zur Säugetierfauna des rheinhessischen Dinotheriensandes.** *Senckenbergiana* 11(4): 267-279. 1929.—Notes are presented on primates, rodents, carnivores, ungulates, and proboscidians found in this German Early Pliocene

deposit. The fauna is derived from the Upper Miocene Sarmatian fauna of Central Europe.—*B. F. Howell.*

23049. **KRAGLIEVICH, LUCAS. Sobre el conducto humeral en las vizcachas y paquirucos chapadmalenses con descripción del "Paedotherium imperforatum." I. La presencia del "canalis supracondyloideus (entepicondyloideus)" humeral permite separar las vizcachas chapadmalenses en un subgénero propio: "Lagostomopsis," n. subgen. II. Ausencia del "canalis supracondyloideus" humeral en algunos paquirucos del horizonte chapadmalense, con descripción de "Paedotherium imperforatum" (F. Amegh.), (sp. inédita). [Humeral aperture in the viscachas and in Pachyrucos of the Chapadmalal formation, with a description of "P. imperforatum."—I. Presence of the humeral "canalis supracondyloideus (entepicondyloideus)" permits the separation of the Chapadmalal viscachas into a distinct subgenus: "Lagostomopsis," n. subg. II. Absence of the humeral "canalis supracondyloideus" in some Chapadmalal species of Pachyrucos, with a description of "P. imperforatum" (F. Amegh.).]** *Anal. Mus. Nacion. Hist. Nat. Buenos Aires* 34: 45-88. 8 pl. 1926-1928[1928].—**LAGOSTOMOPSIS** [also spelled *Logostomopsis*] (p. 48), subg. of *Lagostomus, proposed for the viscachas* of the Chapadmalal formation (Pliocene) of Argentina, type *Viscaccia cuplasia** Amegh. [*Lagostomopsis* is listed as a new genus on pl. I.] This sp. and a Recent one, *Lagostomus maximus**, are compared. *Paedotherium* imperforatum [Hegetotheriidae] (p. 52) is described in detail from cranial and skeletal remains from the Chapadmalal formation in the Col. Paleont. Mus. Nac. Buenos Aires, and compared with spp. of *Pachyrucos.*

23050. **KRIEG, HANS. Über südamerikanische Haustiere I. XIII. Fortsetzung der "Biologischen Reisestudien in Südamerika."** *Zool. Garten* [*Leipzig*] 1(7/9): 273-284. 7 fig. 1929.—The present native dogs* in the Gran Chaco seem to represent a mixture of pre-Columbian and European stocks. All those examined by the author had round pupils, whereas all wild S. Amer. Canidae examined, with the exception of *Lycalopex,* had oval pupils. Thus the ancient native dogs are considered to have been derived from Asiatic and N. Amer. Canidae, and to have been brought with the Indians when they came to S. Amer. Yet most of their peculiarities are of a psychic nature and valueless for an analysis of their phylogeny. After discussing the characters and behavior of these native dogs, the author concludes that those peculiarities which have been isolated through selection of proper domestic animal mutants and have been intensified occasionally by combination, are inferiorities in the sense of natural selection and defective mutants in the sense of genetics.

23051. **MIJSBERG, W. A., and H. J. T. BIJLMER. Report on a fossil found at Trinil (Java) in 1926, and erroneously considered as the remains of a skull of Pithecanthropus.** *K. Akad. Wetenschap. Amsterdam, Verslag Gewone Vergader. Afd. Natuurk.* 35(10): 1207-1214. 3 fig. 1926; also appeared in *K. Akad. Wetenschap. Amsterdam, Proc. Sect. Sci.* 30(1): 126-133. 3 fig. 1927.—Described as the probable fossilized upper end of the humerus of an elephant.

23052. **MOHR, ERNA. Meine beiden Ziesel (Citellus citellus L.).** *Zool. Garten* [*Leipzig*] 1(7/9): 307-313. 2 fig. 1929.—Behavior in captivity described.

23053. **MUNRO, J. A. The spread of the black squirrel in the Toronto region and Victoria County, Ontario.** *Canadian Field-Nat.* 43(5): 108. 1929.

23053A. **OLDHAM, CHAS. Roebuck at King's Langley.** *Trans. Hertfordshire Nat. Hist. Soc. and Field Club* 18 (4): 216. 1929.—An antler of *Capreolus capreolus* found in a neolithic deposit in Hertfordshire.

23053B. **OLDHAM, CHARLES. Serotine bat, Vespertilio serotinus Schreber, in Hertfordshire.** *Trans. Hertfordshire Nat. Hist. Soc. and Field Club* 18(4): 194. 1929. —Recorded at the northern limit of its range in Britain.

23054. **PEARSON, HELGA SHARPE. Chinese fossil Suidae.** *Geol. Surv. China, Palaeontol. Sinica, Ser. C* 5(5): 1-75. 4 pl., 37 fig. 1928.—There are detailed descriptions, and notes on the phylogeny, distribution, and taxonomy of the following forms: *Listriodon* **gigas*** (p. 6), "not later than Pontian nor earlier than Middle Miocene," Kansu; **CHLEUASTOCHOERUS** (p. 11), erected for *C.* **stehlini*** (*Sus s.* Schlosser) (p. 11), Pontian (Upper Miocene), Shansi (type), Honan, and Kansu; *Microstonyx erymanthius** ? (Roth & Wagner), Pontian; *Propotamochoerus* **hyotherioides*** (*Sus h.* Schl.) (p. 58), Pontian and possibly Upper Pliocene; *Sus* sp.*, Pleistocene. The material is part of the Lagrelius collection made in China by J. G. Andersson, and housed in the Paleont. Inst. Univ. Upsala. The relationships of the Chinese *Sus* are discussed, Pilgrim's theory of the Diphyletic evolution of the Suidae is criticized, progressive and unprogressive races of Suidae are characterized, and probable relations between *Microstonyx* and *Dicoryphochoerus* are noted.

23055. **PFIZENMAYER, E. W. Biologische und morphologische Notizen über den Kaukasuswisent.** *Abhandl. Math.-Nat. Abt. Bayer. Akad. Wiss., Suppl. Bd.* 11: 497-504. 3 pl. 1929.—The European bison of the Caucasus is exclusively a forest animal. It climbs mountain passes more than 3000 m. high. It feeds by preference on *Onoclea struthiopteris, Sorbus aucuparia,* and *Ulmus campestris.* At the outbreak of the World War there were more than 500 individuals; in 1918 there were still 100; in 1919, only 50. Reports for the year 1928 give no positive evidence of living individuals.—*E. Mohr* (*transl. by C. V. Green*).

23055A. **PIAZ, GIAMBATTISTA del. Su due piccoli Artiodattili di Cadibona e sulla loro importanza cronologica. [On two small artiodactyls from Cadibona and on their chronological importance.]** *Atti Accad. Sci. Veneto-Trentino-Istriana* 19: 90-98. 1928(1929).—Discusses remains of artiodactyls apparently referable to *Hyracodontherium filholi* and *Bachitherium insigne,* found at Cadibona, Italy, and concludes that the beds in which they were found are probably of Stampanian Oligocene age.—*B. F. Howell.*

23055B. **RIJK, L. A. J. How wild dogs kill their prey.** *Jour. Bombay Nat. Hist. Soc.* 33(3): 704-705. 1929.

23056. **RINGSTRÖM, TORSTEN. Über quartäre und jungtertiäre Rhinocerotiden aus China und der Mongolei.** *Geol. Surv. China, Palaeontol. Sinica, Ser. C* 4(3): 1-23. 2 pl., 1 fig. 1927.—Quaternary spp. *Tichorhinus antiquitatis** Blumenb., China and Mongolia; *Rhinoceros* **oweni*** (p. 6), Upper Pliocene, Szechwan, and Pleistocene, Honan, China. Late Tertiary spp.: *Rhinoceros* aff. *brancoi* Schl., Shansi; *R.* **pygmaeus*** (p. 18), Kansu.

23057. **SAUNDERS, W. E. The water shrew at Scotia Junction, Ontario.** *Canadian Field-Nat.* 43(5): 108. 1929. —Southernmost record of *Sorex palustris albibarbis* in Canada.

23057A. **SCHAUB, S. Über Mus gaudryi Dames aus dem Pontien von Samos.** *Eclogae Geol. Helvetiae* 19 (3): 768-776. 2 fig. 1925(1926).—Reports the discovery of a partial skull from the Pontian in Samos.—*W. Berry.*

23058. **SCHUBART, OTTO. Die Seehunde der Ostsee und ihr Fang.** *Zool. Garten* [*Leipzig*] 1(7/9): 313-324. 1929.—The author gives statistics of the annual catches of 3 spp. of seals in the Baltic Sea. *Phoca vitulina* is the most abundant sp. in the western part, and is not found in the Gulfs of Bothnia and Finland. This sp. and *Halichoerus grypus* penetrated the Baltic from the west. *P. hispida* apparently reached the Baltic from the Siberian coast by way of a former water connection. The food habits of these seals bring them into conflict with the fisherman, and bounties have been paid by the Baltic countries for their destruction. The methods of capture include shooting, harpooning, netting, and trapping. From 1924 to 1927 the total annual catch in the Baltic

varied from 6040 to 14,717. Blubber, flesh, and skin are utilized.

23059. **SCHUSTER, LUDWIG. Wie stillt der Elefant während der Trockenzeit in den Steppengebieten sein Wasserbedürfnis?** *Zool. Garten [Leipzig]* 1(7/9): 302-304. 1929.—In a dry part of Tanganyika Territory the author found in a depression several holes, 1-1.5 m. deep and 30-40 cm. in diameter, with water at the bottom. He considers that these were gradually formed by elephants sucking away the water and the mud as the water level sank with the advance of the dry season.

23061. **STECHOW, E. Über die einstige Hege des Wisent im Urwalde von Bialowies.** *Abhandl. Math.-Nat. Abt. Bayer. Akad. Wiss., Suppl.-Bd.* 11: 505-507. 1 pl. 1929.—The feral wisent cow keeps her calf with her about 3 yrs. and does not rut during this time. For a more rapid increase, 30-40 cows were held in a smaller enclosed area, fed heavily with oats, and the calves were weaned early. As a result, the cows produced a calf almost every year. The isolated wild herds consisted of about 50 head, of which ½ were bulls up to 10 years of age. Older bulls were mostly solitary, peaceable toward humans, but occasionally aggressive toward horses. The rut was in August, with a lesser subsequent rut in November; calves were born at the end of May or the beginning of June. Voluntary hybridization with domestic cattle never occurred. Over-stocking of the Bialowiez Forest with red deer (*Cervus elaphus*) resulted in a scarcity of food for the wisents, and feeding was necessary from Nov. through March.—*E. Mohr (transl. by C. V. Green).*

23062. **STECHOW, E. Über einige Muriden aus Lithauen.** *Abhandl. Math.-Nat. Abt. Bayer. Akad. Wiss., Suppl.-Bd.* 11: 508-510. 1929.—Specimens of *Apodemus* were taken 55 km. northeast of Grodno in a wooden dwelling. With the onset of winter the animals became more frequent in the house. To about 30 pairs of *A. sylvaticus* there was one pair of *A. flavicollis*. The two spp. did not interbreed. *A. sylvaticus* measured up to 16.5 cm. in length; *A. flavicollis*, up to 24 cm. In one *flavicollis* the head and body were 116 mm. long, and the tail, 120 mm., had 160 rings; the under side was pure white. The author recognizes the specific distinctness of *A. flavicollis* Melchior. In addition, *Mus musculus* and *Arvicola terrestris* were taken.—*E. Mohr (transl. by C. V. Green).*

23062A. **STOCK, CHESTER. Tanupolama, a new genus of llama from the Pleistocene of California.** *Carnegie Inst. Washington Publ.* 393. 29-37. 6 pl. 1929.—Describes and discusses the bones of **TANUPOLAMA** (p. 31), type *T.* **stevensi*** (*Lama s.* Merriam and Stock) (p. 31), from the Pleistocene deposits of McKittrick, California, and points out how the genus differs from *Lama* and *Camelops*. The species from the Hay Springs Pleistocene of Nebraska, described by Wortman in 1898 as *Camelus americanus*, is probably also referable to this new genus.—*B. F. Howell.*

23063. **STOCK, CHESTER. Canid and proboscidean remains from the Ricardo deposits, Mohave Desert, California.** *Carnegie Inst. Washington Publ.* 393. 39-47. 4 pl., 1 fig. 1929.—Records and discusses the finding of additional bones of the canid, *Aelurodon aphobus**, in the late Miocene or early Pliocene Ricardo beds of the Mohave Desert; confirms Matthew's earlier suggestion that the sp. is closely related to the Pliocene Snake Creek form, *A. haydeni validus*, and to *A. haydeni* of the Great Plains. The presence of the amphicyonine dog, *Hadrocyon*, at a lower horizon in the Ricardo than the horizon of *A. aphobus* is said to indicate a faunal difference between the two levels. Describes and discusses also from the Ricardo beds bones of 2 proboscidians* belonging to *Trilophodon*.—*B. F. Howell.*

23064. **STOCK, CHESTER. A tooth of Hipparion mohavense from the Puente formation, California.** *Carnegie Inst. Washington Publ.* 393. 49-53. 1 fig. 1929.—Records the discovery in a marine bed, presumably of the late Miocene (or early Pliocene) Puente formation, in southern California, of a tooth of this horse, a sp. found in the late Miocene or early Pliocene Ricardo beds of the Mohave Desert, California. States that in the later Pliocene faunas of the Great Basin region the *Hipparion* horses were principally, if not entirely, of the *Neohipparion* type, with elongate protocone in the upper teeth, while in the California province spp. with shortened and rounded protocone, possibly related to *H. mohavense*, have been recorded from the Siestan Pliocene of the Berkeley Hills.—*B. F. Howell.*

23065. **[SVIRIDENKO, P. A.]** СВИРИДЕНКО, П. А. Степная пеструшка (**Lagurus lagurus Pall.**) на Северном Кавказе и ее систематическое положение. **[L. lagurus in N. Caucasus and its systematic position.]** [German summary.] Известия Северо-Кавказской Краевой Станции Защиты Растений (*Bull. North Caucasian Plant Protection Sta.*) **4**: 47-61. 1 pl. 1928.—This sp.*, formerly known only from Asiatic Russia, was found in southern Russia in 1890, becoming one of the most important pests there during the mouse plague of 1893-95. In 1923-24 there was an enormous increase in the Kharkov Government in the Ukraine. In more recent years it has been found in large numbers in the Ciscaucasian, Don, and Kalmuck steppes, where it sometimes migrates. There is a detailed discussion of geographical variation in color and cranial characters over the whole range of the sp. Bibliography.—*From author's summary.*

23066. **TEILHARD de CHARDIN, P., and C. C. YOUNG. Preliminary report on the Chou Kou Tien fossiliferous deposits.** *Bull. Geol. Soc. China* **8**(3): 173-202. 10 fig. 1929.—Describes in detail these Early Pleistocene deposits in which the hominid *Sinanthropus pekinensis* was discovered, and gives the following provisional list of the mammalian fauna found in it. (Insectivora) *Scaptochirus primitivus; Neomys sinensis; Crocidura* sp.; *Erinaceus*. (Chiroptera) *Myotis* sp. (Carnivora) *Canis* cf. *dingo* ?; *Vulpes* sp.; *Ursus arctos; U. angustidens; Meles* sp.; *Hyaena sinensis; Machairodus* sp.; *Felis acutidens*. (Rodentia) *Arctomys* sp.; *Tamias wimani; Trogontherium* cf. *cuvieri; Cricetulus songarus; C. varians; Microtus* ? *brandti; Apodemus sylvaticus; Micromys* sp.; *Gerbillus meridianus*?; *Siphneus* sp.; *Hystrix* sp.; *Lepus* cf. *oiostolus; L. wongi; Ochotona* sp. (Ungulata) *Rhinoceros* sp.; *Equus* sp.; *Sus lydekkeri; Moschus* sp.; *Pseudaxis grayi* var.; *Euryceros* sp.; *Capreolus* sp. ?; *Spirocerus* sp.; *Ovis* cf. *ammon; Bubalus* sp.; *Bison* sp. (Proboscidea) *Elephas* sp. (Primates) *Macacus anderssoni; Sinanthropus pekinensis*. A bibliography, and a tabular summary of the Pliocene and Pleistocene formations of northern China with some of their characteristic mammals, are presented.—*B. F. Howell.*

23067. **VIRET, JEAN. Les faunes de mammifères de l'Oligocene supérieur de la Limagne Bourbonnaise.** *Ann. Univ. Lyon* 1(47): 5-328. 32 pl., 32 fig. 1929.—Lists the mollusks of the *Helix* Limestone of this region in France, and discusses the age of this Upper Oligocene fauna. Names the mammals found at Peublanc, Coderet, and other places in France; and concludes that (1) no bed holding the typical *Aquitanian* fauna of St. Gérand contains *Helix ramondi*, but only *Helix arvernensis*, with or without *H. beyrichi;* and (2) *Helix ramondi* in great numbers, associated with *H. arvernensis*, characterizes in Limagne an older zone, the Chattian, sometimes entirely lower Chattian. Presents a monographic revision of the fauna of Aquitanian mammals found at St. Gérand-le-Puy, and a description of the Upper Oligocene Stampian fauna of Coderet. The following spp. are described and discussed: Insectivora: *Palaeoerinaceus edwardsi*; P. arvernensis*; Amphidozotherium* aff. *cayluxi*; Talpa* cf. *brachychir*; Sorex antiquus*; S.* cf. *pusillus**. Chiroptera: *Palaeonycteris robustus; Rhinolophus lemanensis; Nyctinomus stehlini**. Rodentia:

*Sciurus feignouxi**; *S. chalaniati*; *S.* aff. *chalaniati**; *Steneofiber eseri**; *Archaeomys arvernensis**; *Dyromys murinus**; *Plesiosminthus schaubi** [genus and species labeled as new, but previously described; cf. B. A. 1: 14506]; *Rhodanomys schlosseri**; *Cricetodon gerandianum**; *C. collatum**; *Rhizospalax poirrieri**; *Issiodoromys pseudanaema**; *Amphilagus antiquus**; *Titanomys visenoviensis gerandianus**; **PIEZODUS** (p. 94) (Lagomyidae), erected for *P.* **branssatensis*** (p. 94); *P.* cf. *branssatensis**. Carnivora: *Amphicyon crassidens**; *A. lemanensis**; *A. rugosidens**; *A.* aff. *eseri*; *Pseudocyon* **gerandianus*** (p. 120); *Haplocyon crucians**; *Cephalogale* **depereti*** (p. 129), type in Univ. Lyon Mus.; *C. geoffroyi**; *C.* cf. *geoffroyi?**; *C. gergoviensis**; *C. gracile**; *Potamotherium valetoni**; *Stenogale brevidens**; *S. brevidens* **leptorhynchus*** (p. 148); *S. b.* **plesictoides*** (p. 151), type in Univ. Lyon Mus.; *S. julieni**; *S.* **gaillardi** (p. 157); *Proailurus lemanensis**; *P.* aff. *lemanensis**; *Plesictis lemanensis**; *P. genetoides**; *P. croizeti**; *P. palustris**; *P.* aff. *pygmaeus**; *P.* **julieni*** (p. 176), type in Paris Mus.; *P. j.* mut. **sicaulensis*** (p. 182); *P. stenoplesictoides**; *P.* **branssatensis*** (p. 180); *Palaeogale angustifrons**; *P. minuta**; *P. waterhousi*; *Amphictis antiquus**; *A.* **borbonicus*** (p. 202); *Herpestes antiquus**; *H. lemanensis**. Ungulata: *Dremotherium feignouxi**; *Amphitragulus elegans**; *A. lemanensis**; *A.* **major*** (p. 221); *A. boulangeri**; *A. gracilis**; *A. primaevus*; *A. feningrei*; *Prodremotherium* ? sp.*; *Cainotherium gracile**; *C.* cf. *geoffroyi**; *C. commune* aff. *elegans**; *Palaeocherus typus**; *P. waterhousi**; *P. meissneri* mut. **elaverensis*** (p. 245); *Protapirus douvillei**; *Paratapirus poirrieri**; *Aceratherium lemanense**; *Ceratorhinus tagicus?**; *Diceratherium pleuroceros*; *Brachypotherium aginense**; *Macrotherium wetzleri**. Marsupials: *Didelphis lemanensis**; *D.* (*Peratherium*) **borbonicus*** (p. 273); *D.* cf. *frequens**. Compares the fauna of St. Gérand-le-Puy with contemporary faunas of other localities. Lists the mammalian faunas of Pyrimont-Challonges, Laugnac, and other localities in France. Discusses the Aquitanian, the Miocene transgression, the marine Aquitanian fauna, the repetition of the mammalian faunas, and the limits of stages. Bibliography of 58 titles.—*B. F. Howell.*

23068. **VOSSELER, J. Vom Binturong (Arctictis binturong Raffl.).** *Zool. Garten* [*Leipzig*] 1(7/9): 296-302. 2 fig. 1929.—Habits in captivity are described.

23069. **WAGNER, GEORG. Zur Geologie der wichtigsten Fundstellen diluvialer Säugetiere im Neckarlande. [The geology of the most important localities of diluvial mammals in the Neckar region, Germany.]** *Palaeont. Zeitschr.* 11(3): 194-196. 1929.

23070. **[VINOGRADOV, B., and S. OBOLENSKII.]** ВИНОГРАДОВ, Б., и С. ОБОЛЕНСКИЙ. Вредные насекомые и другие животные в С. С. С. Р. в 1921-1924 гг. 3. Грызуны. **(Injurious insects and other animals in USSR in the years 1921-24, No. 3. Rodents.)** [English summary.] Труды по Прикладной Энтомологии. (*Works on Appl. Ent.*) 13(3): 177-221. Map. 1926.—Vinogradov reviews the work published by various authors during these years on the systematics of 47 spp. Obolenskii reviews the damage done by rodents and the control measures against them in various regions of the USSR.

23071. **ANONYMOUS. The mode of occurrence of the fossil mammal from Taikei, Formosa.** [In Japanese.] *Jour. Geol. Soc. Tokyo* 36(433): 462-463. 1929.—*Rhinoceros* sp.

INTRODUCTORY GUIDE TO THE INDEXES

Users of Biological Abstracts are reminded that this volume covers only a part of the literature published in the period during which the volume was issued. Succeeding volumes must therefore also be consulted for literature more or less contemporaneous with that reported and indexed in this volume.

SUBJECT AND SYSTEMATIC INDEXES

GENERAL

These indexes are designed to meet the needs both of those whose interests lie chiefly in systematic groups of organisms and of those whose interests are not circumscribed in this way. For the former, chiefly systematic biologists, one of the requisite avenues of approach to their subject is by systematic groups; this is provided by the systematic index. Experience has shown that the needs of those concerned with other biological disciplines are most practically met by a detailed analytical subject index alphabetically arranged; an extensive index of this type is therefore provided.

A special effort has been made to design these two indexes as far as possible in such a way that they will complement rather than duplicate each other. Certain departures from standard indexes will therefore be noted. Chief among these is the policy in the systematic index to carry the indexing only to genera, not to species; the detailed indexing of species, including new ones, occurs under genera in the subject index only. This decision is prompted by the fact that an increasing number of investigators have frequent occasion to locate information concerning species of plants or animals *without necessarily knowing their precise systematic* position in the classification used.

This arrangement will be convenient for systematists as well, especially when seeking information concerning a limited number of given genera; under these circumstances the subject index will be found the more satisfactory, making consultation of the systematic index in such cases unnecessary. When, however, more comprehensive and extended systematic orientation is desired, the systematic index provides a complete condensed approach by groups and their subgroups down to and including genera.

THE SUBJECT INDEX
(pp. 2327 to end)

This index is based upon an analysis of the abstract, not merely the title.

The words, terms, and expressions currently used for the same or closely related subjects vary greatly. If the indexing is done according to the particular words used by authors, much scattering of material concerning the same subject obviously results. Therefore the effort has been to index subjects and not merely words, and, where necessary, provide cross references which will lead the user from words commonly used to the rubrics under which the pertinent material has been assembled. Thus, studies on blood sugar are indexed under that rubric, not under "Hypoglycemia," "Hyperglycemia," or other terms used by authors to denote variations in blood sugar; because of their frequent use, however, "Hypoglycemia," "Hyperglycemia," etc., are entered in their respective alphabetic positions with cross references to "Blood sugar." Similarly, word indexing frequently scatters material referring to the same species; thus, material concerning the domestic fowl would appear under such diverse rubrics as hen, cock, pullet, capon, fowl, chicken, chick, etc.

While an effort has been made through subject indexing to avoid in a large measure the scattering resulting from word indexing, the index is, in the main, not a classified one. Since ease of use rather than strict logic is demanded of an index, the indexing so far as possible is done under the rubrics under which it is thought the majority of users is most likely to search. To this extent the index is frankly opportunistic. Thus the index contains rubrics for "Antibodies," "Antigens," "Complement," "Toxins," "Vaccines," etc., instead of relegating all to subordinate positions under some general rubric, *e.g.*, "Immunity.". Since individual researches tend to be highly specialized, this general policy is believed to result usually in greater convenience to investigators.

This policy necessarily places closely related subjects in more or less widely separated alphabetic positions, and since the index should be useful not only to the specialist but also to those who wish a more comprehensive orientation in a wider field, cross references have been liberally employed to lead users to related material. Also, when the nature of the material has made it possible, the information has not only been entered under, for instance, the specific name of the substance but has been listed again under the class or group to which it belongs. For example, the papers which deal with methylene blue as a stain appear with detailed entries under "Methylene blue," as: "Methylene blue, vacuome-Golgi apparatus identified by, ... 13599," and are listed again, by number only, under "Stains," as: "Stains, methylene blue as, ... 7557, 13599." Similarly papers on specific insecticides are entered in detail under "Chloropicrin," etc., and listed again, by number only, under "Insecticides." Chloropicrin and methylene blue cannot, however, be made exclusively subrubrics of "Insecticides" and "Stains," respectively, because of their importance in other directions.

There are some cases, however, in which there seems to be no necessity for thus scattering related material; especially in cases where there is an anatomical basis for grouping, material has been entered only under the larger group heading. Thus the bones, muscles, nerves, and the various parts of the brain are listed under "Bone," "Muscle," "Nerve," "Brain," rather than under "Ulna," "Sartorius," "Phrenic," "Amygdala," "Restiform body," etc.

Under very broad rubrics only those papers are in general indexed which themselves are broad in content or point of view. Thus, under "Physiology," "Pathology," "Cytology," "Horticulture," "Ecology," etc., will usually be found indexed only books or other general treatments; to do otherwise would make these headings unwieldy and more or less coextensive with the corresponding abstract sections.

Indexing under names of organisms

In general, indexing is done under the scientific name used in the original; *i.e.*, no attempt is made to select the name that might be considered correct under the rules where two or more names are in current use. This results in some scattering of references pertaining to the

same organism, notably among bacteria, where several systems of nomenclature are current. However, specialists will know what names to consult in such cases; also, a limited amount of cross referencing is provided.

When common names only are used in the original, the indexing as a rule is done under these; allocation to genera would in many cases be difficult and introduce errors. Thus, if merely "clover" appears in the original, it is indexed under that name rather than under the genus *Trifolium*, since the plant in question may belong to some other of the several genera members of which are known as "Clovers." Where, however, there is no room for doubt as to the proper scientific name of an organism or group mentioned only by common name in the original, indexing may be done under the scientific name. Between common names and their possible, probable, or certain corresponding generic names, cross references have been provided in a limited number of cases.

Since the same generic name is sometimes used for both plants and animals, the alphabetic arrangement used in the subject index throws these together. In most cases these have been separated. Occasionally, however, the species listed under a generic name will be in part animal and in part plant; reference to the corresponding abstracts at once distinguishes between them.

Studies, especially experimental, on common laboratory animals (guinea pig, mouse, rat, rabbit, dog, cat, etc.) are in general not indexed under the name of the animal; the same applies to man, especially in the fields of physiology, pathology, and anatomy.

In view of the extensive systematic index, the indexing in the subject index is usually not done under group names above the rank of genus. Occasionally it appears desirable to insert references under larger group names, often in anglicized form, *e.g.*, "Diatoms," "Insects," "Fishes," etc. However, every supergeneric group recognized and represented in the systematic index appears in the subject index in Roman type; the page number following refers to the page of the systematic index on which the group is treated, and the exponential figure attached to the page number refers to the column.

Similarly, the page and column references appearing after generic names refer to the exact places in the systematic index where these genera are treated systematically. *It is thus possible to determine instantly the classification of any genus occurring in the alphabetic subject index which appears also in the systematic index.* For example, the genus *Anopheles* in the alphabetic subject index is followed by "(p. 2296[4])"; reference to this page and column in the systematic index discloses that the genus falls in the family Culicidae, order Diptera, class Insecta.

Through the policies outlined in the two paragraphs preceding it is apparent that *the subject index provides at the same time a complete alphabetic index to the systematic index.* It is thus possible for users of the alphabetic subject index to orient themselves systematically as to both genera and supergeneric groups, thereby facilitating the utilization of systematic information—especially by those who find it difficult to do so when only a systematic approach is available. Furthermore, the user is at once put in touch with related genera and groups and the information recorded concerning them, thereby simplifying the problem of approaching a special problem against a background of broad orientation.

Typography

All generic names are in *italic type* (the only exceptions are new genera and subgenera, which appear in bold-faced capitals); all other first words in rubrics are in ordinary Roman type. This will be found convenient: if the search is for a generic name, all Roman type rubrics can be ignored; if the search is for any other subject rubric, all italic names can be passed by automatically.

New genera and subgenera are printed in bold-faced capitals, *e.g.*, **FERRISIA**. Categories below the rank of genus are not indexed in first position, the sole exception being new subgenera.

New species, varieties, etc., appear in lower-case bold-faced type, *e.g.*, *Festuca* **pilgeri**, *Gammarus nigroculus* v. **persetosus**.

New specific, varietal, etc., names proposed to replace preoccupied names are printed in lower-case bold-faced type, with the replaced combination following in parentheses and in italic; *e.g.*, *Armadillidium* **hungaricum** (*A. variegatum*). If the preoccupation is the result of transferring a species from one genus to another, thus involving two generic names, the replaced binomial is also entered in first position, in italic, followed in parentheses by the new binomial (the new name appearing in lower-case bold-face); *e.g.*, *Chantransia endophyticum* (*Acrochaetium* **kylini**).

In *new combinations* (*e.g.*, transfers of members from one genus to another), the specific name appears in lower-case bold-faced type, followed in parentheses and in italic by the genus from which the member is transferred; *e.g.*, *Athyrium* **congruum** (*Diplazium*). The old combination is also entered in first position, but wholly in italic, followed in parentheses and in italic by the genus to which the transfer is made: *Diplazium congruum* (*Athyrium*). If in making the transfer any change in specific, varietal, etc., names is made, the full combinations are given.

A dagger (†) associated with a plant or animal name indicates that it is a *fossil*. The abbreviations in parentheses signify *geological periods*, as follows:

(Cb)	= Carboniferous	(N)	= Neogene
(Cm)	= Cambrian	(O)	= Ordovician
(D)	= Devonian	(Pl)	= Pleistocene
(E)	= Eogene	(Pr)	= Permian
(J)	= Jurassic	(S)	= Silurian
(K)	= Cretaceous	(Tr)	= Triassic

Some necessary variations from the above will be self-explanatory.

In the abstracts an asterisk (*) attached to a name indicates that the form is illustrated.

THE SYSTEMATIC INDEX

(pp. 2255-2307)

The indexing in the systematic index is limited to those disciplines in which the interest is more or less strongly by systematic groups, notably the taxonomic and morphological. Aside from the strictly taxonomic, which will be discussed in more detail below, the indexing is confined at present to the following subjects, the references being grouped correspondingly under the abbreviations given in parentheses:

Morphology, including anatomy (**MORPH.**)	Life History (**L. H.**)
Histology (**HIST.**)	Phylogeny (**PHYL.**)
Cytology (**CYT.**)	Geographical distribution (**DIST.**)
Embryology (**EMB.**)	Bibliography (**BIBL.**)

In indexing specific and subspecific taxonomic entities proposed as new to science, all categories are provided for, of which the more common are the following:

New species (**N. SP.**)
New subspecies (**N. SSP.**)
New varieties (**N. VAR.**)
New forms (**N. F.**)
New aberrations (**N. AB.**)

If entities of two or more kinds (*e.g.*, new species and new varieties) are proposed in the same paper, the paper is entered only under the superior category (**N. SP.**).

Superspecific entities (subgenera, genera, and higher groups) proposed as new to science are listed by name

in bold-faced capitals, *e.g.*, **BARNHARTIA.** New genera appear in alphabetic order among the other genera of the particular group; new subgenera are indented under the corresponding genera; in new supergeneric groups the exact position of the names varies somewhat, depending upon the rank of the group and whether the name is merely indexed or whether utilized by the editor for arranging subordinate groups under it. All new superspecific group names, except genera, are accompanied by a statement of the rank assigned to them by the authors, *e.g.*, n. subg., n. ord., etc.

In new transfers of members from one genus to another (*new combinations*),[1] an index entry is provided, under the genus to which the transfer is made, in the category **N. COMB.**; an entry is also provided under the genus from which the transfer is made—usually the genus in which the transferred member was originally placed—in the category "synonymy" (**SYN.**). This accounts for the fact that a genus name occasionally occurs in a group with which in its modern restricted sense it is not usually associated.

New names proposed to replace preoccupied ones are referred to under the genus in the category **N. COMB.**

New synonymy,[1] *i.e.*, the proposal to unite two or more generic, specific, or subspecific concepts previously considered distinct, is referred to, under the genus or genera involved, in the category **SYN.**

Taxonomic information other than that discussed above, *e.g.*, keys, revisions, synopses, emended descriptions, etc., is entered in the category "taxonomy" (**TAX.**); this is not done, however, for genera to which the same abstract reference has already been made in one of the above categories, *e.g.*, **N. SP.**, **N. VAR.**, **N. COMB.**

Certain *fossil genera* of very doubtful position, or form genera of broad scope, are omitted from the systematic index; they are, however, included in the subject index.

Geographical distribution (**DIST.**) is in general entered in the systematic index only when treated more or less comprehensively or when data of apparently peculiar interest are presented. Some variation in this policy will be noted. Geographical distribution is, however, indexed *fully* by groups under geographical and political units in the Geographical Index (see below). This, it is believed, will be found useful because the interest in much recorded distributional information is local. However, by consulting the geographical index the student desiring more exhaustive information regarding distribution will be able to assemble easily the desired references.

Papers treating a group (family, order, etc.) more or less comprehensively from some point of view (*morphology, taxonomy, cytology, etc.*) are frequently indexed under the broader group, though they may also be entered under individual genera. However, new species, new varieties, new combinations, etc., are invariably referred to under the genera.

Genera are arranged alphabetically under groups, and are therefore easily located. If, on the other hand, the systematic index is consulted for subjects—cytology, embryology, life history, etc.,—the distinctive type used for the abbreviations renders the assembling of references from this point of view almost equally simple.

The *systems of classification* used in the various groups are determined by the editors in charge of the respective sections. In general the policy is to use conservative modern classifications; also, to omit intermediate groups, especially subfamilies (a few large families in Lepidoptera being the only exceptions). Since the purpose of the systems here used is chiefly to facilitate the location of desired information, it is believed that the omission of these taxonomic refinements will contribute to, rather than detract from, the utility of the index; furthermore, these refinements are more likely to be fluctuating and controversial, involving changes in successive volumes confusing to the user of the indexes.

GEOGRAPHICAL AND GEOLOGICAL INDEXES

GENERAL

In the volume 1 index, the geographical and political entities under which the indexing of geographical distribution of organisms was done appeared alphabetically through the subject index. Likewise, the eras and periods under which paleontological material was indexed according to the geological time scale were also entered alphabetically in the subject index.

Beginning with volume 2 these geographical and geological rubrics are organized, respectively, into a compact *Geographical Index* and a corresponding *Geological Index to Paleontological Material.*

THE GEOGRAPHICAL INDEX
(pp. 2309-2324)

This index is devoted to the indexing of geographical information, particularly the geographical distribution of organisms.

The various geographical areas adopted as units for indexing purposes are grouped under the following major headings: North America, South America, Europe, Africa, Asia, Malay Archipelago, Australasia, Antarctica, Oceanic Islands, and Oceans. The arrangement of the areas under each of these major headings is alphabetical except in the case of North America, where the countries are arranged in a general north-to-south sequence. The subdivisions of any country, such as the provinces of Canada or the separate states of the United States, are arranged alphabetically under that country.

Under each geographical area or unit, organisms are listed by group names arranged alphabetically and corresponding approximately to the systematic sections of current abstract issues; *e.g.*, "Coleoptera," "Fungi," "Mammalia," etc. Items of information pertaining to geographical distribution, but not readily classifiable by systematic groups, are entered in the index above the systematic group names.

A limited amount of indexing is done under the larger geographical units (*e.g.*, West Indies; Europe; Africa, northern), either because the papers in question treat the area more or less comprehensively or because the locality data are not sufficiently specific in the original to permit of more circumscribed allocation.

The names of all geographical areas or units adopted for indexing purposes are printed in their proper places in this index. A few, however, are followed by no abstract numbers; this indicates that the current volume contains no material for indexing under those names.

For indexing purposes, it is a general policy to include coastal islands with near-by mainland countries rather than with oceanic island groups. Likewise coastal waters, up to the 100-fathom line, are generally included with the adjoining mainland. Oceans include adjoining gulfs, bays, and smaller seas. For the most part, only aquatic organisms are indexed under oceans. For abstracts dealing with organisms of a certain kind of distribution, such as coastal fishes (Pisces) or pelagic birds

[1] It is the policy to list new combinations in the abstracts provided (1) they are labeled as new (done usually only in plant taxonomy) or (2) text statements make it clear that they are proposed as new. The same policy in general applies to new synonyms, where specific labeling of new synonyms is very rarely done by workers in either kingdom. This policy obviously results in very incomplete recording and indexing of new combinations and new synonyms; however, it results in indexing those which authors record with sufficient clearness.

(*Aves*), *references may be given both under an ocean and under a land area.*

A dagger (†) preceding an abstract number indicates that the abstract deals with a fossil organism or organisms. Various letter symbols in parentheses signify *geological periods*, as follows:

(Cb)	= Carboniferous	(N)	= Neogene
(Cm)	= Cambrian	(O)	= Ordovician
(D)	= Devonian	(Pl)	= Pleistocene
(E)	= Eogene	(Pr)	= Permian
(J)	= Jurassic	(S)	= Silurian
(K)	= Cretaceous	(Tr)	= Triassic

Additional information on the distribution of organisms, as far as it pertains to the geological occurrence of fossil species, is indexed in the Geological Index under the names of the geological periods, on pages 2325-2326.

Abstract numbers in bold-faced type indicate that new taxonomic concepts (e.g., new species or subspecies) are proposed in the papers referred to.

THE GEOLOGICAL INDEX TO PALEONTOLOGICAL MATERIAL

(pp. 2325-2326)

This index is devoted to the indexing of paleontological information on the basis of the geological time scale. The sequence progresses from older to younger strata by eras and periods. Under each period organisms are listed by group names arranged alphabetically and corresponding approximately to the systematic sections of current abstract issues, *e.g.*, "Crustacea," "Gymnospermae," "Mammalia," etc.; the only important exception is represented by "Insecta," the orders of which are not separated. For a detailed systematic approach to paleontological material the Systematic Index should be consulted.

A limited amount of indexing is done under the eras, either because the papers in question are more or less comprehensive or because the geological data are not sufficiently specific in the original to permit of allocation to periods.

In general, geographical locations are not included; for a geographical approach to paleontological material, the Geographical Index should be consulted.

For an alphabetical approach to fossil forms, the Subject Index should be consulted.

Abstract numbers in bold-faced type indicate that new taxonomic concepts (e.g., species or subspecies) are proposed in the papers referred to.

AUTHOR INDEX

All names are given first-position entries whatever their position. For example, an article by K. Onda, K. Okamura, and M. Higashi bears three entries:

(1) **Onda, K.**, K. Okamura, and M. Higashi
(2) **Okamura, K.** (K. Onda, —, and M. Higashi)
(3) **Higashi, M.** (K. Onda, K. Okamura, and)

Given names are entered by initials only.

Names beginning with a prefix consisting of a preposition only (de, d', van, von, di, do, etc.) are in general indexed under the capital letter following. Examples: **Vries, H. de**; but **Van Slyke, D. D.**

Since there are in current use several methods of transliterating Russian characters into Latin characters, some scattering of names results, especially where Russian scientists publish in languages other than Russian. Thus:

В. В. АЛЕХИН as author of a paper published in German appears in the original paper as **W. W. Alechin**; in French, as **V. V. Alechin**; in English, as **V. V. Alekhin.**

Я. В. ЧЕТВЕРИКОВ as author of a paper published in German appears in the original paper as **J. W. Tschetwerikow**; in French, as **I.** (or **G.**) **V. Tchetverikoff**; in English, as **IA. V. Chetverikov.**

This fact should be borne in mind in consulting the author index. In the case of papers published in Russian, authors' names are transliterated in Biological Abstracts according to the Library of Congress (Washington) method.

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LEPTOCARDII · MARSIPOBRANCHII · OSTRACOPHORI · ARTHRODIRA ELASMOBRANCHII · PISCES

(System of classification according to Jordan, "A Classification of Fishes" (1923), with modifications from his later works.)

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(Arrangement of orders and families, in the main, according to Simpson, "A New Classification of Mammals" (1931). *In the Rodentia families and genera are arranged according to Miller and Gidley, "Synopsis of the Supergeneric Groups of Rodents" (1918).*)

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